

Data Management

(or How Do I Handle All of That Stuff?)

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Software Process Improvement (SPI) Project

Purpose and Objectives

- **Purpose:** Introduce the audience to the concept of Data Management and how it should be applied on each project
- **Objective - After this session you should understand:**
 - The objectives of Data Management
 - What a Data Management List (DML) is and what it does for you
 - What tools are available to help you set up a repository for your artifacts

First – Some Definitions

- **Data Management – the organization and control of data generated in the course of a project**
- **Data – artifacts that are products or bi-products of the processes applied in accomplishing the project work**
 - **Example artifacts include draft documents, final documents, analyses, reports, presentations, emails, meeting minutes**

It's February 2009 ... Do You Know Where Your Data Is?

Usually programs/projects/teams have all the data they need to operate, so what's the problem?

- **Data is somewhere, but it's not necessarily organized, maintained ("managed"), or accessible**
- **Often, only deliverable data controlled by formal Configuration Management (CM) is organized and readily accessible**
- **Other data is usually left to the Team lead or project members to organize**
 - **It's on any number of platforms (including local drives on PCs and laptops)**
 - **It's in any number of formats**
 - **It's not accessible to all team members**
 - **It can be lost if the person who put it there leaves**
- **Projects need Data Management (DM) to ensure data availability**

How is DM Different from CM?

- **CM applies only to configuration-controlled items – Documents and/or operational source code that are CCB controlled**
- **DM applies to all data items, not just those formally controlled by a CCB**
 - **CCB-controlled items – documents or other information requiring formal level of approval, such as CCB**
 - **Version-controlled items – documents, information, or software that receive version numbers as they change, but that do not require CCB approval**
 - **Stored items – all data generated in the course of doing business that is not CCB-controlled or version-controlled (such as meeting minutes, monthly reports, metrics, notes, draft reviews, and emails)**

Data Management Objectives

- To make most material available to project members (people like to know where information resides)
- To describe what level of control is needed for each item
- To direct where records should be stored and to organize the repository
- To facilitate monitoring of items to ensure data is kept as planned

Organizing Your Data

- A Data Management List (DML) is a list of all project data (artifacts) that are to be kept in an organized fashion
- A level of control is assigned to each artifact in the DML
- The location of each group of DML artifacts is identified for easy access
- An “owner” of each group of DML artifacts is identified
- Data Management needs to be monitored throughout the project to ensure that expected artifacts are being stored as planned

The DML is Consistent With NASA Policy

- If you completed the SATERN class, “NASA Records Management for Everyone”, you should recognize this:

ORGANIZATIONAL FILE PLAN AND RECORDS LIST						
Organizational Code: _____		Completed by: _____		Approved by: _____		Date: _____
Organizational Name: _____		Records Approval: _____				Date: _____
FILE PLAN CODE	TITLE OF RECORD	RESPONSIBLE FOR MAINTAINING	FILE LOCATION	PROCESS	RETENTION SCHEDULE	RETENTION DURATION

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Our DML Is Similar to a File Plan and Records List

- The DML has different fields from the “File Plan and Records List”, but it accomplishes similar objectives

Data Management List (DML)										
Title	Description / Notes	Created by/ Responsible for updates	Level of Control	Location <i>[Project name]/Folder below OR Server OR URLs</i>	Primary Process Area	Frequency of update/creation	Current Version Number	Current Version Date	ITAR Sensitive?	PPQA Evaluation Required?
Data Management List (DML) (this list)	This is important to Planning, Monitoring and Control and CM	PDL	Version	02 Project Management	PP	As needed			N	

So What Does the DML Do for You?

- **The Data Management Tool * ...**
 - Provides a standard template for a list of the materials generated by a software project
 - Indicates storage location, how items are controlled, and who controls them
 - Includes monitoring fields and a monitoring log to help ensure the expected data items are being collected
 - Includes a time-phased checklist to ensure adequate coverage of monitoring
- **You can customized it for your project ... contact the SPI for information on customizing the tool**

* <http://software.gsfc.nasa.gov/tools.cfm>

A DML Example

Data Management List (DML)												FY 2007	FY 2008				
Title	Description / Notes	Created by/ Responsible for updates	Level of Control	Location	Primary Process Area	Frequency of update/creation	Current Version Number	Current Version Date	ITAR Sensitive?	PPQA Evaluation Required?		Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
Data Management List (DML) (this list)	This is important to Planning, Monitoring and Control and CM	PDL	Version	Management and Administration> Documents - Project Plans>Configuration and Data Management Plan	PP	As needed	1	2/6/2008	N				✓	✓			
CM/DM Plan	See Product Plan section 6.0	CM Lead	CCB	Management and Administration> Documents - Project Plans>Configuration and Data Management Plan	PP	Annual	0.02	9/30/2007	Y	Yes			✓	✓			
Product Plan		PDL	CCB	Management and Administration> Documents - Project Plans>Project Management Plan	PP	Annual	1	10/26/2007	Y	Yes			✓	✓			
Acquisition Management Plan	See Product Plan section 4.0	PDL	CCB	Management and Administration>Planning and Monitoring>Documents	PP	Annual	0.02	9/30/2007	Y	Yes			✓	✓			
Schedule	Schedule, notes and inputs to schedule in the form of redlines/emails	PDL	Version	Management and Administration>Planning and Monitoring>Schedules	PP	Monthly		2/1/2008	N		✓	✓	✓				
Estimates with Basis of Estimates	Includes software and workproduct size estimates, effort estimates, staffing, schedule estimates and basis for all	PDL	Version	PDL Desktop	PP	As needed			N								
Processes	Includes process for both mgmt and technical work. See Product Plan section x.x for references.	ISD Division CCB	CCB	http://software.gsfc.nasa.gov/process.cfm	PP	As needed			N		✓						

Data Management Tool Worksheets

Data Management List (DML)											FY 2007			
											(sample entries/checks for 1st			
Title (must add links to the documents in the delivered PAL)	Description / Notes	Created by/ Responsible for updates	Level of Control	Location (Project name/Folder below OR Server OR URLs)	Primary Process Area	Frequency of update/creation	Current Version Number	Current Version Date	PPQA Sensitive?	PPQA Evaluation Required?	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Data Management List (DML) (this list)	This is important to Planning, Monitoring and Control and CM	PDL	Version	02 Project Management	PP	As needed			N		✓			
CM/DM Plan	See Product Plan section X.X (or this could be a separate plan)	CM Lead	CCB	05 CM Materials	PP	Annual			Y	Yes		✓		
Project Plan		PDL	CCB	02 Project Management	PP	Annual			Y	Yes		✓		
Acquisition Management Plan	See Product Plan section X.X (or this could be a separate plan)	PDL	CCB	02 Project Management	PP	Annual			Y	Yes		✓		
Schedule	Schedule, notes and inputs to schedule in the form of redlines/emails	PDL	Version	02 Project Management	PP	Monthly			N		✓		✓	
Estimates with Basis of Estimates	Includes software and workproduct size estimates, effort estimates, staffing, schedule estimates and basis for all	PDL	Version	02 Project Management	PP	As needed			N					

Monitor each item at least once a year

Enter monitoring observations quarterly

Data Management Monitoring Log		
Instructions for Use: Enter observations regarding expected data vs. what is found. Ensure items are in correct locations in repository, items expected are present, and that items not expected are either added to the data management list or are removed from the repository. At a minimum, some data items should be reviewed quarterly, and all items should be reviewed at least annually.		
Date	Name	Data Management Monitoring Log
10/2/2006	Casto	Reviewed contents of "02 Project Management" folder. ABC development team status reports missing. Carly Simon has found them and placed them in the folder.
6/1/2006	Page	Reviewed meeting minutes folder -- "05 Meeting Minutes". No problems found.

What Should Be in Your DML?

- **Include artifacts from each of the following process areas:**
 - **Project Planning**
 - **Project Monitoring and Control**
 - **Risk Management**
 - **Requirements Management**
 - **Measurement and Analysis**
 - **Configuration Management**
 - **Process and Product Quality Assurance**
 - **Acquisition Management**
 - **Development and Integration**
 - **Verification and Validation**

Types of Data to Include in Your DML

- Records of meetings and events where decisions are likely to be made
 - Minutes, actions, attendance, agendas,...
- Records of Planning and Replanning
 - BOE (reviews and approvals), plans and replans, Branch Status Review (BSR) records, ...
- Records of Tracking Progress
 - Progress measures, progress review records, action items,...
- Records of 'Risk Management'
 - Defining, reporting, mitigating, ...
- Records from Contractor Management Activities
 - Contractor reports, surveillance reports, delivery records, invoices,
- Others
 - Requirements, inspections, change records, key e-mails,...

To enable the management of all of these artifacts, you need a *Data Repository*

Example Development Project DM Repository Structure

Establishing a repository helps organize required records; for example, a network server may have the following directories:

- **Project Management**
 - Planning
 - Status
 - Meeting minutes
- **Project Support**
 - Measurement
 - Configuration Management
 - Quality Assurance
 - Action Items
- **System Engineering**
 - Requirements
- **Development**
 - Technical packages
 - Inspection records
 - Review packages
- **Products**
 - Plans
 - Documents
 - Milestone reviews
- **Test**
 - Plans
 - Results
 - Discrepancies

*Consider developing such a structure for your project.
Use the Web Repository if you have no server.*

Example Acquisition Project DM Repository Structure

Organize acquisition artifacts on a server for non-sensitive or in notebooks or a personal PC for sensitive materials

- **Acquisition Management**
 - Plans
 - Your Status reports
 - Meeting minutes
 - QA records
 - Surveillance records
 - Action Items
- **Contract Materials**
 - Letter of Delegation
 - Copy of contract and changes
 - Invoices and financial records
- **System Engineering**
 - Requirements
- **Development review items**
 - Contractor intermediate products
 - Contractor Review packages
- **Deliverables**
 - Delivery letters
 - Final products
 - Acceptance Test results
- **Close-out records**
 - GFE inventory and records
 - New technology reports
 - Final vouchers

Creating a Repository

- Use a server for your repository if possible so the project has access to the data
 - Keep sensitive information in a protected area or maintain it on the Team lead computer
- If you have a server, set up an organized set of folders to hold your artifacts
- If you don't have a server, there is a **Web Repository Tool** available for free
 - It provides server space on a per-project basis
 - It allows you to identify who has access
 - It allows you to set up your own organization structure and add and delete as desired
 - Go to <http://software.gsfc.nasa.gov/tools.cfm> and look for "Repository (web-based)"
 - Contact point is Chris Durachka, Code 585, Chris.Durachka@nasa.gov

- Plan for data management as you organize your project
- Identify the artifacts that should be maintained as your project proceeds (and let people know)
- Document the artifacts in a DML, identifying the location where artifacts are to be stored
- Set up a project repository where artifacts can be accessed by all team members, but keep sensitive data protected
- Verify that the records are being stored in accordance with your DML
- ... and remember to look for tools at <http://software.gsfc.nasa.gov/tools.cfm>

Questions?

Acronyms

- **BOE – Basis of Estimate**
- **BSR – Branch Status Review**
- **CCB – Configuration Control Board**
- **CM – Configuration Management**
- **DM – Data Management**
- **DML – Data Management List**
- **GFE – Government Furnished Equipment**
- **PDL – Product Development Lead**
- **PPQA – Process and Product Quality Assurance**
- **QA – Quality Assurance**
- **SATERN – System for Administration, Training, and Educational Resources**
- **SPI – Software Process Improvement**